OPINION POLLS AND THE US CIVIL SPACE PROGRAM

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We are accustomed to opening our morning newspapers (or turning on the TV news) and seeing the results of opinion polls. The eye follows the differently coloured bars up and down, and we know instantly whether things are looking up or looking down for our candidate or our cause. The public opinion chart has become a competitor to the ballot box as the index to democratic politics.

The conclusions we can draw from the numbers and percentages that show up on the opinion poll charts depend a great deal on what usually does *not* appear on the newspaper page or television screen. Subtle biases can result from the population interviewed, the time of day individuals were called, how a particular question was asked, or how the answer was interpreted. Let me give you an example:

In 1961 the Gallup poll reported that slightly over one-third of the adults in the U.S. thought the U.S. was ahead of the Soviet Union in space, and slightly over one-third of the adults in the U.S. thought the Soviet Union was ahead of the U.S. in space. How about the rest? Well, the rest - or 25% - had "no opinion." How many people do you know who admit to having "no opinion" on the issues of the day? If most of us are unsure of what we think, or are neutral, or haven't a clue about a topic we're asked about, we'll equivocate. We'll make a safe guess. My guess is that in 1961 few members of the U.S. public had the foggiest idea about who was really ahead in space. But they would have a chance to find out. Within a week after the last Gallup interview survey for the 1961 poll was taken[1] President John F. Kennedy announced the Apollo Program to send a man to the Moon and return him safely.

Another example: Recently we have heard that 80% of the American people support the space program. This is the kind of news that makes us feel good. The 80% "loves us" figure comes from two recently completed opinion surveys. One was done for Rockwell International by the respected firm of Yankelovich, Skelly and White/Clancy Shulman. The other poll was done, also within the last year, by Jon D. Miller of the International Center for the Advancement of Scientific Literacy.

Let's take a close look at who this 80% of the American people actually are. In the Rockwell poll the persons surveyed are actually only the registered voters in the United States. Since 1984 the percentage of American adults registered to vote has ranged between somewhat less than 70% to 70%. That means that 80% of *slightly less than three-fourths* - or actually a little over one-half - of all adult Americans support the space program.

There's also more to the Miller poll than meets the eye. Miller uses a model of public participation in policy-making that looks like a pyramid. At the very peak of the pyramid is a handful of top-level policy-makers. Next comes a slightly larger "leadership group" that interacts regularly with actual policy-makers. This group includes nationally known scientists, aerospace corporation heads, heads of relevant disciplinary organizations, and the like. Third down on the pyramid is a group of well-informed people called the "attentive public." fourth comes the "interested public," and last - across the bottom of the pyramid - we find the non-attentive public. The public "attentive" to space is the public Miller is interested in. This group is not only interested, but also knowledgeable about the space program.

Miller has found that between 1979 and 1990 the "attentive public for space exploration" has ranged between 8% and 10% of American adults. This is about 15 million adults. So, the 80% of Americans who support the space program, in Miller's study, are actually 80% of the 10% who comprise Miller's "attentive public for space exploration" - or, 8% of the adult population in the United States.

If, however, we look at Miller's four main groups - the attentives, those interested in space, those interested in science, and the residual public whose interests are not known - we find that the "interested public" supports space exploration almost as much as that portion of the public attentive to space, and that more than half of those adults interested primarily in science as distinct from space, and more than half of the residual public, also favour space exploration in varying percentages. It turns out that Miller's study, examined close, demonstrates that just a little under two-thirds of the adult population of the U.S. supports space exploration[2].

American public opinion about the space program, as an aggregate of opinion surveys taken over three decades, has measured fairly consistently except for brief upward movements during the Apollo program and after the Challenger accident in January 1986. In this consistency it mirrors the history of NASA's budget, which has been the most constant, in real-year dollars, of all Federal budget priorities since 1966[3].

In this good news, or bad news? I think this is good news. This country of ours is a big place, with many different ethnic, racial, philosophical, professional, and occupational groups as well as "interest groups" spread across a very diverse geographic and socio-economic landscape. To be able to say that over one-half of the adults across this United States have supported space exploration to some degree is to be able to say a good deal. And it gives us a currency to invest in the market

1 The interviews in which the following question was asked were May 17 through May 22, 1961: "Which country - the United States or Russia - do you think is farther ahead in the field of space research?"

2 Or, 80% of the "attentive public" (80% of 10%) = 8%; 82% of the "interested public" (82% of 15%) = 12%; 59% of the "interested in science public" (59% of 25%) = 15%; and 58% of the "residual public" (58% of 50%) = 29%.

3 Between 1966 and 1990 the NASA budget increased by 102% in real-year dollars. The next smallest increase during this period was the Department of Defense budget, at 406%. The two largest increases over the period have occurred in the Interest on the National Debt (1770%) and Health and Human Services (1550%). The total US Government budget increased 789% between 1966 and 1990.

of public opinion that has held its value, unlike the inflated 80% coin.

If we stop here we will have missed an opportunity to learn something about those who *don't* support space exploration. Why do we care about what these people think? For one thing, most of us in this business are spending *their* money as much as money from those who *do* support what we do.

One of the most striking features of the opinion polls' portrait of the American who supports the space program is that he is more likely to be male, Catholic, white, college-educated (but not a holder of a graduate or professional degree), not yet "forty-something," Republican, and receiving an annual income well over the median average annual household income for the year in which the poll was taken.

The *good* news is that the margin between this supporter of the space program and the American woman, or person with less than a college education, a non-Catholic, someone over forty, a Democrat, a member of an ethnic minority, and someone struggling along with a lower-than-median income, is small - typically 10% to 12% in responses to survey questions. These demographic characteristics of the supporters and non- or marginal supporters of the space program have also remained consistent, in all polls, over the last three decades.

Let's consider what the less than enthusiastic or non-supporters of space exploration have in common. Aside from political and religious differences (which increasingly cross economic and ethnic boundaries), women, minorities, the less-educated in non-salaried occupations, have more intimate experience of the immediate burdens of putting food on the table, raising children, and caring for the elderly. Necessities of daily living have the greatest reality and urgency to them. This characteristic is underscored by the fact that Democrats (statistically) are more likely to question the value of the space program, and the Democratic Party has recaptured the White House and has done very well in the Congress, where budgets are finally hammered out.

The needs and concerns of women, minorities, older persons, and the non-affluent are more, rather than less, likely to influence the shape of the priorities of national politics. In 1984 and again in 1988, a higher proportion of women than of men had registered to vote. *All* non-Caucasian population groups are growing faster than the census-taker's white population, the only population group growing more slowly than the national average.

And then there is the phenomenon of the "graying of America." The number of people who will be seven years and over at the turn of the next century have been born. We can count them, and we know that persons over 50 will be the largest single age group by the end of this century. And we know from experience that more of the older people will vote.

There is also, among women especially, a certain down-to-Earth scepticism in their hesitations about the value of the space program. Women have, historically, not provided a large market for science fiction magazines and books[4]. The almost 60% of adult Americans who favoured continuation of or increase in U.S. space activity in 1965 included around 90% - and more women than men - who had no interest in going to the Moon themselves. Twenty years later one-half of the adult men surveyed had decided that at least a trip into space might be exciting. But not so the women, three fourths of whom said in effect, "no thanks."

> Well, we have our work cut out for us! But what kind of work should we do? A still closer look at the polling data will give us some clues.

The survey data indicate that those who support the space program support it for its more enduring scientific value than for its dramatic one-time achievements. Polling returns tell us that more Americans saw the Apollo program as another effort to 'beat the Russians' than as an essential goal of U.S. space exploration. As the sequence of Apollo missions unfolded from the first landing in July of 1969, public support for the space program did not increase; it deteriorated. The proportion of Americans *opposed* to more government expenditures in space from 1965 to 1975 increased from one-third to one-half of all adult Americans.

Public opinion during this period was fairly consistent with the outlook of the Congress. NASA's appropriations slid downwards between 1965 and 1975 to their lowest point since 1964. It was 1980 before NASA received appropriations, in dollars unadjusted for inflation, comparable to what it received at the height of the Apollo period.

Polls attempting to identify the public's favoured rationales for space exploration suggest that the habit we have of equating the space age with that earlier era of trans-Atlantic Exploration - more properly called the Age of Reconnaissance - may not be a good one. Once we demonstrated that we could get to the Moon before the Russians could, Americans supporting the space program may have come to feel that space exploration must be justified by something more ennobling than military advantage or commercial gain - the most powerful motivations of the late 15th and 16th century voyages.

Though the media have consistently given more attention to the more accessible Shuttle and human space flight program, the visibility of media attention can be misleading. In 1988, the year that the Shuttle returned to flight after the Challenger accident, over half of all adults surveyed chose science as the best rationale for space exploration. Those most interested in the space program divided about equally over the question of whether military or commercial rationales were more important. Interestingly enough, among the groups Miller identified as primarily interested in science (as distinct from space exploration) and the "residual public," military security led in 1988 over commercial applications as a preferred rationale by a margin of 2 to 1.

If a majority of Americans who support space exploration do so for the sake of scientific knowledge, then polling data tells us that they have not been well served. Notice that I do not say that *science*, or *scientists*, have not been well served; *only that the public that supports the civil space program has not been well served in its belief that science justifies space exploration.* This is a critical distinction.

One would suppose that those among us who support space exploration would know more than the rest about our solar system and our and neighbouring galaxies. The data we have, however, tell us otherwise. Miller's 1990 surveys also explored scientific literacy among the population groups he had identified. Recall that these groups were the "attentives" to space exploration, those interested in space, those interested in science, and the "residual" public. To qualify as "scientifically literate" in Miller's survey, a person had to demonstrate competence in three areas:

- understand the meaning of terms like radiation, DNA, molecule, or laser,

4 Sam Moscowitz, "The Growth of Sicence Fiction From 1900 to the Early 1950s, "*Blueprint to Space: Science Fiction to Science Fact*, Frederick I. Ordway and Randy Lieberman, eds. (Washington: Smithsonian Institution Press, 1992).

- understand what science is and how scientific judgments differ from other ways of knowing things, and

- understand some of the impacts of science and technology on one's daily life and society in general.

Using these criteria, Miller found that only 20% of the attentive public for space exploration could be considered scientifically literate. As low as this percentage is, it is still twice as large as the percentage of persons in Miller's other categories - including those only *interested* in space or science.

Perhaps people who are truly "attentive" to space exploration could be excused from knowing about DNA, or science in fields other than astronomy. But consider this: less than one-half of these people agreed with the "Big Bang" theory of the origins of the universe. More than a third did *not* know that the Earth revolves around the Sun once a year. More than half believe UFO's are space ships from other civilizations. "Attentives" to space exploration are *less* likely to visit a science and technology museum than they are to visit a natural history museum or a zoo or an aquarium. Fewer people "attentive" primarily to space read the daily newspaper than do people "attentive" primarily to science. On the other had, fewer people "attentive" to science have seen the films *ET, Star Wars, Star Trek* or *Close Encounters of the Third Kind* than have people "attentive" to space exploration *or the public simply interested in space.*

Let's turn to younger people - students who have entered middle and high school since 1987. Are they any *more* knowledgeable about science or space?[5] The principal study of this younger group concludes that there has been no increase among them over the past four years in their level of interest in space, or their sense of being well informed about space. Experiencing additional years of high school has had no effect on their interest or knowledge. Boys outnumber girls in *interest*, but girls outnumber boys in scepticism, if their disbelief in UFO's is any indication[6].

The civil space program has most certainly advanced our knowledge and understanding of the cosmos. It has most certainly advanced space science, and with it, many scientific disciplines and careers. But it appears that this knowledge has not been conveyed to ordinary people, in ordinary language. These are the people who pay for the space program. They believe the program is valuable because it advances knowledge. But their support appears to be truly an act of faith.

If scientists are poor at communicating, lucidly and interestingly, what they do and what they learn, then those of us who can understand the significance of what we're learning from space have a special obligation to try to articulate that understanding as widely as we can.

As for the sparse knowledge of the next generation, this problem is larger than a problem of communicating the returns of the space program. Too many of our young people cannot write a coherent paragraph, do not know what century the Civil War occurred in, and do not know what socio-political conditions tend to breed Fascism - if they even know what Fascism is. We of the space program are, as they say, "in good company" with many other fields worrying about the intellectual and cultural, much less functional, impoverishment of the next generation.

Let me return to a remark I made at the beginning: I observed that most of us are reluctant to admit that we have no opinion about a subject. And so, most of us will voice an opinion, no matter how uninformed. We are so easily awed by the reputed mysteries of science that we lack the nerve to say: Wait a minute. I don't understand what you mean. Why does it matter that we've discovered "there are temperature fluctuations of only about thirty millionths of a degree Kelvin in different reaches of the sky"? If the scientists and engineers won't volunteer to explain and justify to us what they do, we must insist on it. We must insist on it for their sake, as well as for ours.

And so, there is more to learn from opinion polls than that a good proportion of adult Americans support the space program. We can learn that social and economic security are not competing goals with space, but interdependent goals. If we want to increase public support for space, we must increase the number of Americans who have the economic freedom to take an interest in something besides getting by, day after day. We can also learn that the majority of those who support the space program can distinguish between the bread and circuses of space travel. They're content to experience extraordinary adventures in the movie theatres; for their tax dollars they want real return in expanded scientific knowledge and understanding. Finally, we can learn that we need to increase that return, not just for scientific careers, but for the ordinary people who pay our bills and for their children, our children. Ultimately the space program is for them, as all investments in the future must be.

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5 Miller's conclusions are based on the Longitudinal Study of American Youth which has followed a national probability sample of ca. 3,000 middle school and ca. 3,000 high school students since 1987. The study annually collects a science achievement test and reports from each student's science and mathematics teachers.

6 44% of boys believe UFO's are space vehicles from other civilisations, while only 31% of the girls do.

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